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# RELATION BETWEEN FREQUENCY AND INTENSITY OF PRECIPITATION.

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[Department of Labor, Washington, D. C., Aug. 14, 1918.]

**NOTE.**—Through the courtesy of the U. S. Department of Labor, Bureau of Industrial Housing and Transportation, Mr. Robert Watson, President, the Weather Bureau is able to reproduce the accompanying set of diagrams showing for selected stations of the Bureau, the relation between the intensity and frequency of rainfall in storms of various durations. This is an example of the practical use that may be made of statistics of excessive precipitation which have been published by the Weather Bureau for many years.—EDITOR.

The accompanying diagrams have been prepared from data of excessive rainfalls contained in the annual reports of the U. S. Weather Bureau, in most cases beginning about 1896. The tables relating to excessive rainfalls contain records from self-registering rain-gages of all storms in which the rate of fall equalled or exceeded 0.75 inch per hour. Twenty-three stations have been selected as sufficient to represent the various parts of the country in which the housing projects of the Government are located.

The data have been plotted with ordinates representing intensities and abscissas representing average periods in years between successive storms of the intensity and duration in question. Thus on the diagram for Boston, the point having an ordinate of two and abscissa of four, indicates that an intensity of two inches per hour for 30 minutes has been experienced on the average once in four years, during the period covered by the records; that is,

there have occurred five storms during the entire period of 20 years in which the intensity for 30 minutes has equalled or exceeded two inches per hour. During this same period two of these storms equalled or exceeded 2.7 inches per hour, as shown by the point (2.7) (10), and one storm had an intensity of about 2.9 inches per hour.

These diagrams will be found very useful in the design of storm sewers. They not only give the intensities of rainfall for various periods of time, but the probable frequency of any given intensity and so give valuable information of the frequency and extent to which sewers designed for a given capacity are likely to be overtaxed. Thus if the capacity of a given sewer at Boston, for example, is dependent upon a 20-minute storm, then the diagram shows an intensity of about 2.5 inches per hour can be expected about once in four years, and if the sewer be designed on this basis it may be expected that it will be overtaxed once in 10 years to an extent produced by a rainfall intensity of 3.4 inches per hour.

The diagrams have been prepared by Mr. E. P. Burke under the direction of Mr. F. E. Turneaure, both of the Housing Bureau. They are issued for the use of the various engineers engaged on the housing projects of the Bureau.























